5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Melicope adscendens* (Alani)

Current Classification: Endangered

FR Notice announcing initiation of this review:

U.S. Fish and Wildlife Service (USFWS). 2006. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 70 species in Idaho, Oregon, Washington, Hawaii, and Guam. Federal Register 71(69):18345-18348.

Lead Region/Field Office:

Region 1

Pacific Islands Fish and Wildlife Office, Gina Shultz, Assistant Field Supervisor Endangered Species

Name of Reviewer(s):

Marie Bruegmann, Pacific Islands Fish and Wildlife Office, Plant Recovery Coordinator
Marilet A. Zablan, Pacific Islands Fish and Wildlife Office, Recovery Program Leader and Acting Assistant Field Supervisor for Endangered Species

Methodology used to complete this 5-year review:

This review was based on the final critical habitat designation for *Melicope adscendens* and other species from the island of Maui, as well as a review of current, available information. The National Tropical Botanical Garden, subcontracted by the Hawaii Biodiversity and Mapping Program, provided an initial draft of portions of the 5-year review.

Background:

For information regarding the species listing history and other facts, please refer to the Threatened and Endangered Species System (TESS) which is part of the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database.

Application of the 1996 Distinct Population Segment (DPS) Policy:

This Policy does not apply to plants.

Review Analysis:

Please refer to the final critical habitat designation for *Melicope adscendens* published in the Federal Register on May 14, 2003 (USFWS 2003) for a complete review of the species' status (including biology and habitat), threats, and management efforts. No new threats and no significant new information regarding the species biological status have come to light since listing to warrant a change in the Federal listing status of *M. adscendens*.

Melicope adscendens, a tree with scrambling, vine-like branches, was discovered on the southwestern slope of Haleakala Volcano on the island of Maui by Forbes in 1920. Only

one plant was subsequently relocated in 1982, when it was rediscovered in the Auwahi District of leeward East Maui (USFWS 1994 and 1997). There is a single plant of this species on State owned land in Kanaio Natural Area Reserve, inside a small exclosure. The other known plants, approximately 25, are on private lands at Auwahi. Fruit was collected from the Kanaio plant in 2006. All the weeds in the exclosure were removed, either manually or chemically. No flowers or fruits were observed in 2006 at Auwahi (H. Oppenheimer, Maui Nui Plant Extinction Prevention Program, pers. comm. 2007).

The major threats to *Melicope adscendens* include habitat degradation and trampling by cattle *(Bos taurus)*, deer (*Axis axis*), feral goats (*Caprus caprus*), feral pigs (*Sus scrofa*) (Factors A, C, and D); fire (Factor E); disturbances from ranch activities (Factor E); and habitat degradation by and competition with invasive introduced plant species (Factor E), including *Asclepias physocarpa* (balloon plant), *Bidens pilosa* (beggar's tick), *Bocconia frutescens* (no common name), *Lantana camara* (lantana), *Melinis minutiflora* (molasses grass), *Mimosa pudica* var. *unijuga* (sensitive plant), *Opuntia ficus-indica* (prickly pear cactus), *Pennisetum clandestinum* (kikuyu grass), *Salvia coccinea* (sage), and *Senecio* sp. (groundsel). Plants are also damaged by black twig borer (*Xylosandrus compactus*) (Factor C). The endemic microlepidopteran *Prays* cf. *fulvocanella* which is known to feed on the buds, flowers, and seeds of *M. adscendens* (Factor C) (USFWS 1997). Fragmentation of the population may make cross-pollination difficult, and the species is rarely observed with fruit (National Tropical Botanical Garden 2007).

In addition to all of the other threats, species like *Melicope adscendens* that are endemic to small portions of a single island are inherently more vulnerable to extinction than widespread species because of the higher risks posed to a few populations and individuals by random demographic fluctuations and localized catastrophes such as hurricanes and disease outbreaks (Factor E). When considered on their own, the natural processes associated with being a single island endemic do not affect *M. adscendens* to such a degree that it is threatened or endangered with extinction in the foreseeable future, but these natural processes can exacerbate the threat from anthropogenic factors, such as habitat loss for human development or predation by alien species (Factor E) (USFWS 1997).

The Maui office of the USGS Biological Resources Division, in collaboration with Ulupalakua Ranch, USFWS, Native Hawaiian Plant Society, Living Indigenous Forest Ecosystems, and numerous volunteers, initiated an experimental "nurse forest" restoration project in a 4-hectare (10-acre) exclosure in western Auwahi. The success of this first exclosure led to a second 8-hectare (20-acre) exclosure which is currently being restored (Medeiros *et al.* 1998). The Auwahi exclosures have now become part of the Leeward Haleakala Watershed Restoration Partnership, an effort to restore forests on leeward East Maui. USFWS has provided additional funds since 1998 for the expansion of these fences and ongoing weed control (M. Bruegmann, USFWS, pers. comm. 2007). Construction of an additional fence to protect five *Melicope adscendens* plants in Ulupalakua Ranch has been delayed because of the need to drill into rock to set a few posts, which will hopefully be completed in 2007 (Maui Nui Plant Extinction Prevention Program 2006). Seed is stored at Harold L. Lyon Arboretum's Micropropagation

Laboratory, the Center for Conservation Research and Training Seed Storage Laboratory, and the National Tropical Botanical Garden. National Tropical Botanical Garden also has one *M. adscendens* plant in cultivation (Harold L. Lyon Arboretum Micropropagation 2007; Center for Conservation Research and Training Seed Storage Laboratory 2007; National Tropical Botanical Garden 2007).

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for Maui plants (USFWS 1997), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. Melicope adscendens is a long-lived perennial, and to be considered stable, the taxon must be managed to control threats (*e.g.*, fenced) and be represented in an *ex situ* (at other than the plant's natural location, such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on Maui. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population.

The stabilization goals for this species have not been met (see Table 1). Therefore, *Melicope adscendens* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Collect seed from all remaining wild individuals.
- Fence remaining wild individuals of *Melicope adscendens* to protect against ungulates.
- Continue weed control at Kanaio and expand to Auwahi.
- Reintroduce material into protected suitable habitat within historical range of the species.
- Study *Melicope adscendens* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, limiting factors, and threats.

References:

Center for Conservation and Research Training Seed Storage Laboratory. 2007. Database Unpublished.

Harold L. Lyon Arboretum Micropropagation Laboratory. 2007. Database. Unpublished.

Medeiros, A. C., C.F. Davenport, C.F., and. C.G. Chimera. 1998. Auwahi: Ethnobotany of a Hawaiian Dryland Forest. Cooperative National Park Resources Studies Unit, University of Hawaii/Manoa, Department of Botany. Technical Report 117. Available at: usgs-brd-pierc-hfs/index.html> >Starr <../../starr/index.html).

Maui Nui Plant Extinction Prevention Program. 2006. Plant Extinction Prevention Program of Maui Nui. Progress report for the period 2006.02.01 through 2006.07.01. Prepared for U.S. Fish and Wildlife Service and Hawaii Division of Forestry and Wildlife. Unpublished.

National Tropical Botanical Garden. 2007. Provenance report for accessions 060524 and 060826. Unpublished.

[USFWS] U.S. Fish and Wildlife Service. 2003. Endangered and threatened wildlife and plants; designation of critical habitat for 60 plant species from the islands of Maui and Kahoolawe, HI; Final Rule. Federal Register 68(93)25933-26165.

[USFWS] U.S. Fish and Wildlife Service. 1997. Recovery plan for the Maui plant cluster. U.S. Fish and Wildlife Service, Portland, OR. 130 pp. + appendices.

[USFWS] U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; endangered status for three Hawaiian plant species in the genus Melicope. Federal Register 59(323):62346-62352.

Personal Communication:

Oppenheimer, Hank. 2007. Island Coordinator, Maui Nui Plant Extinction Prevention Program. Emails to National Tropical Botanical Garden, July 17, 2007.

Table 1. Status of *Melicope adscendens* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1994 – listing	1	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
1996 – recovery plan	16	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	No
			3 populations with 25 mature individuals each	No
2003 – critical habitat	16	0	All threats managed in all 3 populations	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	No
2007 – 5-yr review	26	0	All threats managed	Partially
			Complete genetic storage	Partially
			3 populations with 25 mature individuals each	Partially, 1 population

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SIGNATURE PAGE for 5-YEAR REVIEW on *Melicope adscendens*

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-year review:

_____ Delisting
_____ Reclassify from Endangered to Threatened status
_____ Reclassify from Threatened to Endangered status
_X_ No Change in listing status

Field Supervisor, Fish and Wildlife Service

Approve Patrick Leonard Date 1/15/09